PLANT MSH2 SEQUENCES AND METHODS OF USE

ABSTRACT OF THE DISCLOSURE

The invention relates to isolated nucleic acid molecules encoding MutS homologues (MSHs). Such MSH proteins are involved in DNA mismatch-repair processes in organisms. The invention provides isolated nucleic acid molecules comprising *MSH2* nucleotide sequences which encode MSH2 proteins and *MSH2* nucleotide sequences which encode dominant-negative MSH2 variants. Such *MSH2* nucleotide sequences find use in altering mismatch repair, mutation rates and recombination frequencies in both eukaryotic and prokaryotic organisms. The invention also provides isolated nucleic acid molecules comprising *MSH2* promoter nucleotide sequences. Such *MSH2* promoter nucleotide sequences find use in regulating the expression of genes of interest in plants. Additionally provided are isolated proteins, transformed host cells, and transformed plants, tissues, cells and seeds thereof.